

subject, and exhibit its practical bearing. It is the best collection of mathematical examples we have yet met.

(9) Now that an experimental course of statics has obtained a firm foothold in the school curriculum, it is possible to introduce boys of no special mathematical talent to certain features of theoretical work. In addition to the elements of geometry and algebra, nothing more than a knowledge of the trigonometry of the right-angled triangle is needed for applications of all the fundamental ideas which make this subject educationally valuable.

The volume before us contains just what is needed for work of this character. It opens with the use of pulleys and the ideas of work, power, velocity-ratio, and efficiency. Then follow simple cases of moments and applications to the more important machines. In this way the student is led at once to see the practical utility of the work, and is able by experiment to clarify his conception of force, etc. No use is made of the parallelogram and triangle of forces until comparatively late in the course, and formal bookwork proofs are postponed to the end. The examples are chosen so as to illustrate the principles of mechanics rather than to test the student's analytical ability.

(10) We are glad of this opportunity of directing attention to the work that is being done by the London Mathematical Society. All those who are interested in any branch of higher mathematics, whether they hope or intend to do any research work or not, should apply for election. Only in this way is it possible for students to keep in touch with the trend of modern developments when their University days are over.

OUR BOOKSHELF.

British Rainfall, 1913. Compiled under the direction of H. R. Mill. By R. C. Mossman and C. Salter. Fifty-third annual volume. Pp. 92+384. (London: E. Stanford, Ltd., 1914.) Price 10s.

THIS valuable publication is well known to readers of *NATURE*, having been frequently referred to in its columns. The fundamental part of the work includes: (1) general tables of total rainfall, and (2) observers' remarks on the weather; these are of great interest, and refer mostly to exceptional phenomena. The discussion of the data deals *inter alia* with monthly and seasonal rainfall, heavy daily falls, and the relation of the annual rainfall to the average. A great rainstorm of September 17, which was most intense near Doncaster, is illustrated by a coloured plate; the area with more than an inch of rain in about fourteen hours comprised more than 1300 square miles. The rainfall of the year over the whole of the British Isles was almost exactly equal to the

average of thirty-five years (1875-1909). The excess in Wales was 9 per cent. and in Ireland 7 per cent.; elsewhere there was, generally speaking, a deficiency. The volume includes three special articles: (1) an appreciative memoir of the late Sir John Murray, who represented Scotland on the Board of Trustees of the British Rainfall Organisation; (2) the dry summer of 1913—in July and August the rainfall deficiency was 60 per cent. over the United Kingdom as a whole; (3) frequency of heavy rains in short periods, 1868-1913. The useful work of the organisation is dependent upon voluntary contributions, but unfortunately it is not self-supporting; the director has to meet considerable deficiencies, consequently application for Government aid has become necessary.

Handbook of Photomicrography. By H. Lloyd Hind and W. Brough Randles. Pp. xii+292+44 plates. (London: George Routledge and Sons, Ltd., n.d.) Price 7s. 6d. net.

THIS book gives a useful and adequate account of the theory and practice of photomicrography. It is written from the point of view of the beginner and amateur, and full explanations are given of the principles governing the results aimed at and of the methods for obtaining these results. Photomicrography with the lowest and highest powers is dealt with, and wherever possible simple and home-made apparatus is described. In addition to photomicrography proper, the various photographic processes are explained and described, and methods of making lantern slides, colour photography, and the preparation and mounting of objects are included. The book is well produced and profusely illustrated both by figures in the text and with forty-four plates, several of which are coloured and reproduced from direct colour photographs. The plates illustrate very well the different results that can be obtained with different methods of illumination, various objectives and varying adjustments. We believe that Messrs. Hind and Randle's handbook will be found a very useful work on the subject of photomicrography.

The Microscopy of Drinking Water. By Prof. G. C. Whipple. Third edition, rewritten and enlarged. Pp. xxi+409+xix coloured plates. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1914.) Price 17s. net.

WE are glad to welcome the third edition of this valuable book. Since the first edition was issued in 1880 an enormous amount of work has been devoted to the study of the microscopic organisms in water, and the increase in size of the present edition bears witness to this. The mystery of the comings and goings of various groups of algæ and protozoa in our lakes and reservoirs still, however, remains unsolved. From the practical side much progress has been made in the artificial means of controlling Plankton growths and the purification of waters containing them.

The first part of the book has been almost rewritten, and contains chapters on copper treatment for eradication of algæ, the soil-stripping of

reservoir sites and the use of the microscope and photomicrography. The latter portion of the book, containing descriptions of various groups of water-organisms, has also been revised, and the plates showing the commoner organisms of water have been printed in colours, making identification easier.

The book is one which should find a place in every bacteriological and public health laboratory and in the office of the water-engineer.

R. T. HEWLETT.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Micromillimetres and Micromicrons.

It is very desirable that men of science should adhere to the conventions which have been established with regard to the use of the terms employed for units in the metric system. It has been generally agreed that the prefixes mega- and micro- should indicate the multiplication and division respectively by a million of the unit expressed by the term they precede. In this way a micrometre usually shortened to *micron*, means a millionth part of a metre, or, in other words, a thousandth of a millimetre; and a *micromillimetre* signifies a millionth part of a millimetre, or, what is the same thing, a thousandth part of a micron. It is, therefore, to be regretted that in the translation, published in Geneva, by L. Duparc and Vera de Dervies, of Nikitin's excellent account of Fedorov's "universal" method of microscopical mineral research we find the term *micromicron* employed in place of micromillimetre. The former term should mean a millionth part of a micron—that is to say, a metre $\times 10^{-12}$, a unit that might be usefully employed in expressing intermolecular or interatomic distances in crystals, which we are now at last in a position to determine in many cases.

JOHN W. EVANS.

Imperial College of Science, South Kensington,
September 3.

Origin of Species.

IN Darwin's great work on this subject he claims that Dean Herbert, in 1822 and 1837, held that "single species of each genus were created in an originally highly plastic condition, and that these have produced, chiefly by intercrossing, but likewise by variation, all our existing species."

Years of study along this line have assured me that he was right. I am now especially interested as I have a few trees on hand which seem to prove this position. They are a cross between *Quercus* and *Juglans*, which bears walnut-like nuts on a tree which bears oak-like leaves: at least a new species and perhaps a new genus. If this tree had been found in the forest it would have caused no remarks, but originating in the garden it has become the wonder of the world. Here is an oak tree in appearance which bears perfect walnuts, all originated in one year and fairly productive and fixed.

This tree gives me further evidence of the fact that all sexual life known to us, both animal and vegetable, has sprung from hybrids.

NEWTON B. PIERCE.

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NO. 2341, VOL. 94]

LECTURES ON THE ANIMAL KINGDOM BY LINNÆUS.¹

IT is probable that most modern zoologists, when unfamiliar with the Scandinavian tongues, know little of the zoological writings of Linnæus beyond the "Systema Naturæ," and that from this restricted evidence they draw the natural but entirely erroneous conclusion that, considered as a zoologist, Linnæus was little more than a methodical compiler, classifier, and name-giver. If, moreover, the modern zoologist is not so well acquainted with the history of his science as he should be, he is apt to seize rather on the defects, or even absurdities, in the "Systema" as compared with his own knowledge, and to ignore the real advances made by the great Swede over the attempts of his predecessors. There are, as we have hinted, many writings by Linnæus that prove the falsity of such opinions, and now another has just been issued by the University of Uppsala which enables one to read between the lines of the "Systema," and to realise the wide zoological knowledge and still more the philosophy and humanity on which it is based. The volume consists of a complete course of lectures on the animal kingdom, delivered by Linnæus between 1748 and 1752, and collected from the notes made by various pupils, of which more than forty manuscripts are preserved in the university library. The collation of these manuscripts was begun by the late Dr. M. B. Swederus, and has been completed by Dr. Einar Lönnberg, with the help of Miss Greta Ekelöf. The lectures are followed by a detailed commentary and by short accounts of 123 authors quoted by Linnæus; these two parts are by Dr. Lönnberg, who has availed himself of the help of various colleagues, living and dead.

And now of Linnæus as a lecturer, what may we think? Approaching him at second-hand, and without the magic of his enthusiastic presence, we yet see how he infused a living and practical interest into what might so easily have been a dry catalogue of species. An undergraduate's notebook omits much that the writer does not consider essential, the humorous asides, the occasional divagations, the purple patches; but the students of Uppsala realised that they listened to no ordinary man, and it is clear that much has been taken down verbatim. Certainly, that must be the case with the stately Prolegomena, which we should like to have translated in full, but must at least make some attempt to abstract:—

Generation after generation of earthly creatures comes into being only to pass into nothingness. And yet, though fashioned only for vanity, each creature struggles to preserve its life; one preys upon another so that nature is a *bellum omnium perpetuum in omnes*, and of all creatures man is most inhuman. And yet man, with his works of wisdom, his castles and towers, comes only to dust. What is the object of so vain a contrivance? The answer is given by natural history.

¹ Linnés Föreläsningar öfver Djurriket, med understöd af Svenska Staten för Uppsala Universitet utgifna och försedda med förklarande anmärkningar af Einar Lönnberg. (Uppsala, 1913.)